

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/25041

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01M 8/06, 12/06; B60K 1/00

US CL : 429/17, 21; 180/65.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 429/17, 21, 13, 19; 180/65.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,237,410 A (ERICKSON ET AL.) 02 December 1980, Abstract, Figs 1-2, col. 3, lines 15-26; col. 5, line 51-col. 9, line 20.	22, 24
Y	US 4,081,693 A (STONE) 28 March 1978 Abstract, Figs 1-3, col. 1, line 66-col. 2, line 23; col. 2, line 61-col. 5, line 20.	22-25
A	US 6,193,929 B1 (OVSHINSKY ET AL.) 27 February 2001	1-25
A	EP 0578837 A1 (ABELIN ET AL.) 19 January 1994	1-25
A	US 5,693,201 A (HSU ET AL.) 02 December 1997	1-25
A	US 5,976,332 A (HSU ET AL.) 02 November 1999	1-25



Further documents are listed in the continuation of Box C.



See patent family annex.

Special categories of cited documents:

- * "A" document defining the general state of the art which is not considered to be of particular relevance
- * "E" earlier application or patent published on or after the international filing date
- * "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- * "O" document referring to an oral disclosure, use, exhibition or other means
- * "P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

10 December 2003 (10.12.2003)

Date of mailing of the international search report

24 DEC 2003

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-8 and 14-18 drawn to a power supply system.

Group II, claims 9-13, drawn to a method of charging a metal-air converter.

Group III, claims 19-21, drawn to a method of propelling a vehicle.

Group IV, claims 22-25, drawn to an electrically-powered vehicle.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Groups I and IV do not include the step of converting the metal oxide back to the metal as do the Group II and III claims. Group I comprises a generator which is not part of claims of Group IV. In addition, the Group IV vehicle must have the capacity to travel over 300 miles, which limitation is not part of the Group I system. Finally, Groups II and III are different because Group II is drawn to a method of charging a converter while Group III is directed to a method of propelling a vehicle; two materially different processes requiring different steps.

Continuation of B. FIELDS SEARCHED Item 3:

EAST

search terms: generator, metal air, aluminum air, zinc air, vehicle, car, auto, automobile, converter, battery, motor, transmission, engine, electric, hybrid, battery powered, electrically powered, 300, three hundred, range, distance, mile